SYSTEM AND METHOD OF PARALLEL LOADFLOW COMPUTATION FOR ELECTRICAL POWER SYSTEM

ABSTRACT

Gauss-Seidel-Patel Loadflow (GSPL) computation method involving self-iteration over a node within global iteration over (n-1)-nodes in n-node power network is invented. The parallel loadflow computation is characterized in the use of a network decomposition technique referred to as Suresh's diakoptics that determines a sub-network for each node involving directly connected nodes referred to as level-1 nodes and their directly connected nodes referred to as level-2 nodes and so on, wherein the level of outward connectivity for local solution of a sub-network around a given node is to be determined experimentally; the use of parallel solution of all sub-networks using available solution estimate at the start of the iteration without intermediate updating of solution estimate, and because a node could be directly connected to two or more nodes or a part of two or more sub-networks emanating from different nodes, a parallel solution iteration involves adding and taking the average of all the solution estimates or corrections obtained for a node in the parallel solution of sub-networks emanating from different nodes; and the use of the invented simplified parallel computer: a server-processor and array-processors architecture, wherein each of the array processors communicate only with server processor, commonly shared memory locations, and each processor's private memory locations, but not among themselves.